

ENTRY NO. FM-3
 NAME OF MACHINE SYNCHRO-CYCLOTRON LYON
 INSTITUTION Service Commun du Synchrocyclotron
 ADDRESS Université Claude Bernard Lyon-1 - 43 Bd du 11 Novembre 1918-69622 Villeurbanne Cedex(France)
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 IN CHARGE Prof. B. E. LAHNECH REPORTED BY G. HADINGER

HISTORY AND STATUS

DESIGN, date Model tests
 ENG DESIGN, date 1956
 CONSTRUCTION, date 1962
 FIRST BEAM, date (or goal) 1963
 MAJOR ALTERATIONS 1965

COST, ACCELERATOR 2.7MF
 COST, FACILITY, total 7.5MF
 FUNDED BY Ministre de l'Education Nationale

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 2 CRAFTS
 GRAD STUDENTS involved during year
 OPERATED BY Research staff or 2 Operators
 OPERATION hr/wk. On target hr/wk
 TIME DISTR. in house % Outside %
 BUDGET, op & dev
 FUNDED BY

RESEARCH STAFF, not included above

USERS, in house outside
 GRAD STUDENTS involved during year
 RESEARCH BUDGET, in house
 FUNDED BY

MAGNET

POLE FACE, diameter (compact) 180 cm, R extraction 75 cm
 R injection cm
 GAP, min 35 cm, Field 14.7 kG }
 min 35 cm, Field 14.7 kG } at 0.61 10⁶
 AVERAGE FIELD at R ext kG } Ampere turns
 B max/ < B >
 NUMBER OF SECTORS { compact } Spiral, max deg
 { separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS

CONDUCTOR, material and type ALUMINUM
 STORED ENERGY (cryogenic) 1 MJ
 POWER: main coils max, kW; current stability
 trimming coils max, kW; current stability
 WEIGHT: Fe 200 tons; coils
 COOLING system
 ION ENERGY (bending limit) E/A = q²/a² MEV/amu
 (focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 20 180 deg
 BEAM APERTURE 18.5 cm; DC Bias 0.2 kV
 TUNED by, coarse fine
 RF 10.4 to 11.0 mHz, stable ±
 Orb F to mHz
 HARMONICS, RF/Orb F, used
 DEE-Gnd, max 22 kV, min gap cm
 STABILITY, (pk-pk noise)/(pk RF volt)
 ENERGY GAIN, max kV/turn
 RF PHASE, stable to ± deg
 RF POWER input, max 23 kW
 FREQUENCY MODULATION, rate 2.000 /s
 modulator, type Rotating capacitor
 beam pulse, width 40 μ sec macrocycle

VACUUM SYSTEM

OPERATING PRESSURE 8 x 10⁻⁶ Torr or mbar
 PUMPS, No, Type, Size 1 Diffusion pump
 50 cm diamètre

ION SOURCES

OPEN ION SOURCE

INJECTION SYSTEM

EXTRACTION SYSTEM

Magnetic Regenerative

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 160 m²; movable m²
 TARGET STATIONS 6 in 2
 STATIONS served at same time, max
 MAG SPECTROGRAPH, type
 COMPUTER model
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
d		28	30	1.5
o		56	10	

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg pμ A of MeV ions
 PHASE EXC. max RF deg pμ A of MeV ions
 EXTRACT eff % pμ A of MeV ions
 RESOL ΔE/E 2-2.5 % pμ A of MeV ions
 EMITTANCE
 (π mm. mrad) { 40 axial } pμ A of MeV
 { 40 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS 10%
 BIOMEDICAL APPLICAT 70% ISOTOPE PRODUCTIONS 20%

REFERENCES/NOTES

- 1)
- 2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.